

What is claimed is:

1. A method for evolutionary optimization, comprising the following steps:
setting up an initial population as parents,
reproducing the parents to create a plurality of offsprings,
evaluating the quality of the offsprings by means of a fitness function, said fitness function is one of an original fitness function and an approximate fitness function, and
selecting at least one offspring having the highest evaluated quality value as parents,
characterized in that the frequency of the use of the original fitness function is adaptable during the optimization process.
2. The method according to claim 1, wherein the frequency of use defines a control cycle terminated by the use of the original fitness function, wherein the approximate fitness function is updated at the end of every control cycle.
3. The method according to claim 1, wherein a covariance matrix of a probability density function adapted during the evolutionary optimization is used for weighting new samples at the end of every control cycle.
4. The method of claim 1, wherein the fidelity of the approximate fitness function is estimated locally at the end of a control cycle based on every use of the original fitness function to adjust the future frequency of use of the original fitness function.
5. The method of claim 1 further comprising the steps of:

calculating, at the end of each control cycle, a current model error on the basis of a difference of the result of using the original fitness function and the approximate fitness function, respectively, and

adapting, at the end of each control cycle, the future frequency of use of the original fitness function on the basis of said current model error.

6. The method according to claim 1 wherein the approximate fitness function is implemented by a neural network model.

7. The method of claim 1, wherein the quality of all offsprings of a generation is evaluated if said original fitness function is used.

8. The method of claim 1, wherein the quality of only a selected number of offsprings of a generation are evaluated if said original fitness function is used.

9. The method of claim 1 for optimizing a spline encoded problem.

10. The method of claim 1, wherein the original fitness function is calculated by a Navier-Stokes-solver.

11. A computer program stored in a computer readable medium for performing the method of claim 1.

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